

**M**athSoft, Inc., Cambridge, Massachusetts is a leading developer of calculation software for desktop computers. Founded in 1984, MathSoft released its principal product —Mathcad®— a year later. Mathcad provides an easy-to-use software alternative to scratchpads, whiteboards, calculators and spreadsheets.

A new version of the software package, Mathcad Plus 5.0, was introduced to the market in January 1994. Designed for such users as electrical engineers and computer scientists who need advanced math functionality, Mathcad Plus 5.0 incorporates an expert system that determines a strategy for solving difficult mathematical problems, then provides the solution. This new capability — called SmartMath™ — extends the interactive nature of Mathcad, which automatically updates results as variables or formulas change.

SmartMath resulted from a company effort involving integration into Mathcad of CLIPS (C Language Integrated Production System), a NASA-developed shell for creating expert systems. CLIPS is designed to allow for the research, development and delivery of artificial intelligence in conventional computers. A collection of conditions, and the actions to be taken if such conditions are met, are constructed into a rule network by the CLIPS "rule engine." As facts are asserted, they are matched to the rule network. The versatility and portability of CLIPS

has made it a valuable research tool for a variety of applications.

Described as a major advance in calculation software, SmartMath provides an intelligent interface between the user's problem and Mathcad's numeric and symbolic capabilities. By using the NASA-developed program, MathSoft saved the time and money involved in writing a program from scratch.

SmartMath reviews the user's input and executes a strategy for solving the problem by writing a new set of Mathcad Plus equations in a pop-up window and delivering the results to the Mathcad Plus document. The user is thus freed from having to construct his own Mathcad solutions. Mathcad Plus 5.0 enables users to interact with every number and symbol in a wide range of graphs and plots (**photos**).

CLIPS was made available to MathSoft by NASA's Computer Software Management and Information Center (COSMIC)\*. Located at the University of Georgia, COSMIC supplies industrial and other organizations government-developed computer programs that have secondary applicability (see page 128).

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